Reflections and Perspectives on the Future of Intaglio User Experience
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What is the contribution of intaglio to the user? Well traditional gravures as we see them in many banknotes, including the euro, do not contribute much to the visual user perception. The European Central Bank emphasizes the tactility of the euro notes: “Special printing processes give banknotes their unique feel”, the visual aspects are not part of the description of public features.

In other words:
When people use a banknote, it is usually thoughtless; the user is in automatic mode.
Perceiving a complete banknote, the user is in configural mode and is mainly focused on the recognition of the banknote’s value. Something may alert the user to look at a banknote more accurately and the user may switch to controlled mode. Now, the entire note is being watched with attention and subsequently the user may decide to inspect a single feature, a switch from configural to feature mode.

The perception of the visual and tactile characteristics of a gravure print is a case of multi-sensory input. The tactility design and the visual design should support each other for a maximum perceptual effect, column A in the figure 3.

Two examples of good feature concepts are provided in figure 4.

Multi-sensory input

<table>
<thead>
<tr>
<th>Perception</th>
<th>Feature concept</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
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<tr>
<td>Visual effect</td>
<td></td>
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<tr>
<td>Haptic effect</td>
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<tr>
<td>Multi-sensory effect</td>
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++ = high positive sensory effect  o = neutral sensory effect
+ = positive sensory effect - = negative sensory effect

Good intaglio structures

Examples feature concept A

Indeed, the most important contribution of intaglio is the ‘feel’ component. Why? Because the working memory is busy with the visual information, the retailer, the shop, the change (coins and banknotes), the storage device etcetera’s. So the visual working memory is fully occupied (a working memory can take 3 to 5 chunks/topics).
At the same time the tactile memory does not have much to do. That is why people who have detected a counterfeit tell that they felt that something is wrong with the banknote, it felt different.
When people look at a banknote they may see details up to 40 µm (figure 5). But when people feel a banknote, especially when the index finger is involved, people may perceive details of about 1 µm!

Smallest detail people may perceive

\[
\text{Look (eyes) } \sim 40 \, \mu \text{m} \\
\text{Feel (finger) } \sim 1 \, \mu \text{m}
\]

Intaglio is a production technique and not a user function. Banknote design should follow a use-centered design policy. The Upid-Model has been developed for this purpose (figure 8).

I foresee a shift from UIF 3 to UXF 3, as explained in figure 9. Intaglio printing may contribute to keeping confidence in banknotes, a User Experience Function (UXF), instead of being a public security feature, a User Interface Function (UIF).

To enhance the tactility of intaglio, dedicated structures should be designed as described above. Traditional portraits do not provide such specs, so should be avoided.

Two examples of good intaglio design are former Dutch banknotes, shown in figure 7. The NLG 10/Frans Hals issued in 1971 has both very thick and very thin lines. The NLG 100/Little Owl, issued in 1992 has a dot structure in transparent intaglio and also includes thick and thin lines.

NLG 10/Frans Hals 
Issued 1971

NLG 100/Little Owl 
Issued 1992

figure 7

Taking a banknote

\[ \text{Haptic a sensation} \]

A
B
C

Bending of the paper, fingers on two sides
Movement over the surface
Properties are perceived with 3 fingertips

figure 6

Shift from UIF 3 to UXF 3

Old school thinking

- I know what to check.
- I know the name.
- I know where the feature is.
- I know how to judge if it is genuine.
- I can check soiled, crumpled banknotes.
- ...

New school thinking

- I trust banknotes.
- I think the banknote is good protected against counterfeiting.
- Features are not for me, but for counterfeiters.
- ...

figure 9
As the main contribution of intaglio is ‘feel’, intaglio can be replaced by other techniques that deliver a better tactile sensation. For example a contrasting front-reverse, like smooth-sharp effects or rough-glossy. Another concept are small glass beads inside the paper or other added tactile elements, like a mesh band as illustrated in figure 10.

Two sided haptic banknote design

1) Contrasting front – reverse (e.g. smooth/sharp, rough/glossy)
2) Web of spheres (e.g. glass beads)

gg

cross section top and bottom view

figure 10

Our industry can do more to enhance the user experience generated by intaglio. More studies to what users need expect. As introduced in figure 9, I foresee a shift from authenticity check (UIF 3) to a confidence experience (UXF 3). People do not have to check their banknotes, they check less-and-less. Instead they have an increased trust in banknotes. And they are right.

Intaglio technology developers (design tools and printing machines) should orientate their research and development activity to meet future banknote user needs. More studies are needed on perception of banknotes by the main users, the public and the retailers. Follow a use-centered design policy and, in case of intaglio technology, make studies of haptic perceptions of feature concepts.

If I was a banknote designer, I would amend the traditional use of intaglio to create a valuable UX; no longer traditional portraits on the front of the note, but tactile structures on the reverse (in line with figure 11). Furthermore, I would develop different tactile structure concepts, together with the theory on multiple sensory input (figure 3).

That said, there are certain things that a banknote designer should not do with intaglio when it comes to designing and creating a positive user experience. Designers should not stick to a technology-driven intaglio approach. They should opt for a use-centered design policy. To complete my view, I have contrasted yesterday’s banknote design policy and one for tomorrow (figure 12). As people will use cash less-and-less the characteristics of banknote design will shift.

In conclusion intaglio has already lost its major position to foil applications (at least in case of the euro banknotes). One has to wait to see what the outcome will be for intaglio.